

Derivative Thermogravimetry (DTG) with the TIME DERIVATIVE COMPUTER

MARK II

- * Brings out detail you might miss in conventional weight curves
- * Distinguishes between samples with nearly identical weight curves
- * Eliminates graphical differentiation
- * Simplifies theoretical calculations
- * Increases precision of measurements



The Time Derivative Computer produces an output voltage proportional to the rate of change of the input voltage. It was developed for use with the Cahn Recording Electrobalances® to compute the rate of change of sample weight. The Computer is of the passive electrical analog type for maximum reliability, minimum cost, and good convenience of operation. It does not interfere with the normal recording of weight, nor is it affected by normal operation of the balance controls.

Simultaneous recording of weight and derivative on separate recorders will generally be found most useful. The computer is designed for use with 1 mv potentiometric recorders, either X - time or X - Y, but less sensitive recorders can be used with correspondingly less sensitivity.

The Computer can be used with both RG and RH Electrobalances, with the following ranges full scale on a 0-1 mv recorder:

RG	A	0-0.2, 0.4, 1, 2, 4, 10, 20 mg/minute
	B	0-1, 2, 5, 10, 20, 50, 100 mg/minute
RH	LO	0-2, 4, 10, 20, 40, 100, 200 mg/minute
	HI	0-20, 40, 100, 200, 400, 1000, 2000 mg/minute.

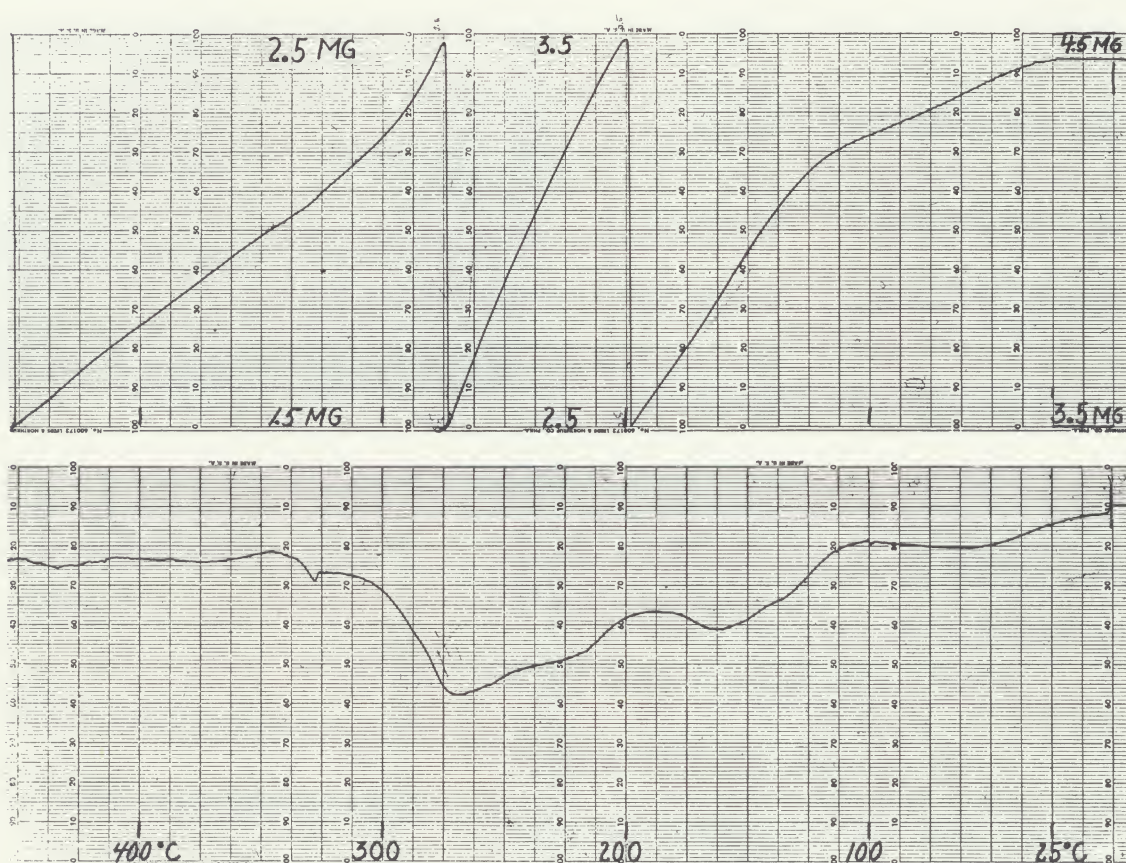
Ranges available for your setup are indicated directly without calculation, and only these ranges are visible. The Computer is not quite as sensitive as the balance, so that for the smallest rates of weight change the direct weight trace is still preferable, as in electrometry. Exact calibration is done by simultaneous recording of weight and derivative on a changing sample. The Computer includes an uncalibrated zero control for setting zero rate of change to any point on the recorder chart. The Computer requires no external power, fits conveniently on top of the balance control unit. Anyone can install and connect it.

In TGA the Computer is ideal. For thermogravimetry of natural products and other samples without sharply defined transitions it may be essential. It provides distinctive qualitative curves, and provides rate information for kinetic calculations directly and precisely. It can also be useful in evaporation rate studies, vapor pressure determinations, and other fields.

WITH OTHER INSTRUMENTS

The time derivative is significant for many other physical quantities besides mass. The Computer will compute the derivative of any voltage applied to it, and thus can be used with most scientific instruments which use a recorder or meter. Ranges are the same as for RG loop A, but now in millivolts per second full scale on a 1 mv recorder instead of mg/min, so that the finest range is 0.2 mv/sec full scale. The Computer does not load the primary instrument for d.c. Output considerations are the same as when used with the Electrobalances. It is well filtered against "noisy" signals. Try it with your other instruments.

DERIVATIVE THERMOGRAVIMETRY



Thermogravimetric curves on 4.435 mg sample of mentholated cigarette tobacco, run on Cahn RG Electrobalance with #2006 TGA Kit. Temperature was programmed at 12.5 C/min; each time division is 1 min. Upper curve is conventional plot of weight vs time. It shows few distinguishing features. Lower curve is time derivative at 0.4 mg/min full scale, computed and recorded simultaneously. Since sample weight only decreases, all values are negative, and zero has been offset to +90%. Minimum at 270 C is -0.1916 mg/min. Small peak at 330 C, and large double peak between 200 and 300 C, seem to be typical of these samples. Derivative curve is more distinctive.

#3100 Cahn Time Derivative Computer, Mark II, complete with cables and instructions.

CAHN
INSTRUMENT COMPANY

7500 Jefferson St., Paramount, Calif. 90723, U.S.A. • 27 Essex Road • Dartford, Kent • Britain